DDA 81-0689/2
29 June 1981

MEMORANDUM FOR: Deputy Director for Administration

STAT FROM: [redacted]
Information Handling Systems Architect

SUBJECT: Training Requirements for IHS

REFERENCE: Memo Report to DDA from D/OT&E, dtd 24 June 1981

1. I think this is a very creditable job performed to a tight, specific schedule. What the report tells me is:

° There is a substantial, looming demand which we are not prepared to meet. It takes lead time to put the needed resources in place, and we have some lead time. If we move out smartly, training will not become the IHS utilization bottleneck it otherwise threatens to be.

° Most of the components of the Agency have not really focused on their IHS training requirements. The data collection obviously suffers from the fact that we do not all speak the same language. Even with backup guidance, there were still substantial variations in interpretations of categories. As a consequence, the aggregate numbers have more value than those for specific categories of individuals.

° While at first glance some of the numbers seem high, it should be noted that the follow-on training to learning how to do basic functions, like WP, is not included. I think the general levels are about right, but early. Our terminal availability schedule does not correlate with such high demand as indicated in '82, for example.

° Investing in computer-aided instruction (CAI), which lets the terminals do the teaching would be well worthwhile. It could substantially alleviate the required OT&E resources for skills training.

SUBJECT: Training Requirements for IHS

° We need to develop a much more detailed IHS training plan--a process that could take 4 to 6 months, instead of 2. It should be an Agency-wide effort led by OT&E. In the context of this process we need to start planning and budgeting for the needed resources.

2. Overall, I think the report probably reflects user demand for IHS services as much as it does training. Clearly the expectations for services utilization are very high. They appear to me to exceed significantly what has been anticipated, SAFE included.

STAT

cc: D/OT&E
D/ODP

Karen,

Set up a meeting if he desires at OTE for Bill and I to visit the ISC for briefing on what they are doing now, what SAFE means for their future and this paper.

1026 C of C
Wed - 15 Jul - 9:00 a.m.

ROUTING AND TRANSMITTAL SLIP Date

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REMARKS

This memorandum from the IHSA contains no recommendations for immediate action - other than a suggestion that OTE ought to proceed with a more detailed study lasting perhaps 4 to 6 months.

The attached OTE report is already the subject of some controversy. I contacted ODP Management Staff (they received a carbon copy) and their comment is that they are currently reviewing the document and will probably write a position paper on it.

This whole issue will need to be addressed prior to approval of any firm recommendations from the IHSA or OTE. For now, no action is requested.

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ROUTING AND RECORD SHEET

SUBJECT: (Optional)

STAT FROM: [redacted]
Information Handling Systems Architect

EXTENSION

NO. DDA 81-[redacted]

DATE 29 June 1981

TO: (Officer designation, room number, and building)	DATE RECEIVED	DATE FORWARDED	OFFICER'S INITIALS	COMMENTS (Number each comment to show from whom to whom. Draw a line across column after each comment.)
1. MS/ Deputy Director for Administration				
2. EO/DDA		1/7	AW	
3. ADDA				
4. DDA			J	
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11.				
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15.				

FORM 1-79 610 USE PREVIOUS EDITIONS

81-0689/1

OTE 81-6508

24 JUN 1981

MEMORANDUM FOR: Deputy Director for Administration

VIA: Information Handling Systems Architect

STAT FROM: [redacted]
Director of Training and Education

SUBJECT: Training Requirements for IHS

REFERENCE: Memorandum to Director of Training and Education from Deputy Director for Administration, dated 10 April 1981, Same Subject (DD/A 81-0689)

I. Introduction and Methodology

This report is in response to the requirement outlined in the referenced memorandum. The need to determine the totality of training requirements of the wide variety of information handling systems now in use or scheduled for implementation in the next few years is essential. Actually defining those requirements, however, is a difficult and complex task. Therefore, it is our hope that the effort represented by this response is the first step in a continuing and active study and dialogue between the Office of the Systems Architect, the Office of Data Processing (ODP), the Office of Training and Education (OTE), and the project officers in each directorate responsible for major information handling systems. It is our view that only in that way can training requirements, and how best to meet them, be defined in sufficient detail and accuracy to plan and commit necessary resources.

To gather the data required to respond to your memorandum, representatives of OTE met with each Directorate ADP Control Officer and, in the case of the Administration Directorate (AD), met with each Office ADP Control Officer. The component officials were told that the data would probably be aggregated and would be treated as a best approximation.

SUBJECT: Training Requirements for IHS

II. Potential Training Requirements

The accuracy of the data collected varied from component to component depending to a large extent on the stage of development of each system and the degree to which training is considered as an essential factor in successful operation of that system. The basic data are presented in Chart I - Potential Training Requirements which is included as Attachment A.

The values presented in this chart are new training requirements for the next four fiscal years. These values represent four classes of people: those who are occupying newly created positions, personnel rotated into an existing position requiring training, personnel who are out-of-date in their level of information and need retraining, and personnel who need training because a new system has been implemented.

Definitions used for the categories of personnel on Chart I are as follows:

- Project Manager is someone involved in the management of either acquiring or building an information handling system.

- Project Builder is someone who works in the construction of an information handling system. This activity usually involves systems analysis, design, coding, and validation.

- Client Manager is someone who manages employees who use a system or information coming from it.

- Client User is someone who obtains information from a system or puts information into a system.

- Client Transfusion is a process by which a client user receives informal training in the work environment sufficient to interact minimally with an information handling system.

- Operations/Maintenance Manager is someone who supervises the operation and maintenance of equipment and software which constitutes an information handling system.

- Operations/Maintenance Worker is someone who operates or maintains ADP-related hardware or maintains associated software.

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Several items on this chart need further amplification:

- The "client user" category includes training on word processing systems. The FY-82 requirement of 4,799 client users, for example, includes 3,329 word processing training requirements. Applying a transfusion factor of 50 percent, which is probably conservative, results in a figure of approximately 1,700 training requirements for word processing users. This number is included in the 3,018 shown in FY-82 as "net client users." In FY-83 and Fy-84, the requirement is less than 350 but increases again in FY-85 to approximately 1,000. This pattern suggests that Agency offices are anticipating a virtual flood of word processing training requirements in FY-82 with a three-year cyclical pattern after that.

- SAFE training is scheduled to begin in FY-83 and skills training for 690 analysts is included in the client user figure for that year.

- Training for the CRAFT system is not a significant factor in the numbers reported in this chart. The number expected to be trained in the "client user" category is approximately 250 per year.

- CAMS training, which is ongoing now at the rate of approximately 150 per year in the client user category, increases to approximately 450 in FY-84 with the introduction of CAMS II.

- Training for the MERCURY system is not reflected in this chart because training is not expected to start until late in FY-85.

SUBJECT: Training Requirements for IHS

III. Instructor Staffing Requirements

Instructor staffing requirements shown in Chart II (Attachment B) were derived from the potential training requirements. For all types of training, the total number of students was divided by assumed class sizes of 15 students per skills class, 25 students per information science class, and 35 students per systems development technology class. Class durations were assumed to be 2 weeks for skills, 1 week for information science, and 3 weeks for systems development technology. Two different assumptions were made for instructor availability and hence two sets of numbers are shown in Chart II. The first set assumes that instructors would spend 35% of their time (18 weeks of the year) in the classroom. The second set of figures assumes an instructor availability in the classroom of 75% (39 weeks per year). This figure is close to maximum and valid only if the instructors have no other duties. Finally, each of these values was multiplied by the number of instructors desirable for each class. This was assumed to be 2 for skills, 1 for information science, and 1 for systems development technology. The staffing requirements were aggregated into these areas:

- Skills training - includes net client users only.
- Information science training - includes project managers, project builders, client managers, and some of the net client users (one-fourth was used as an estimate for these calculations).
- Systems development technology training - includes project managers, project builders, and the two operations/maintenance categories.

Some estimates of classroom, hardware, and dollar resource requirements using the data and methodology of Chart II yield the following:

- Skills Training
  - -- Classrooms:

    $$\frac{402 \text{ (weeks of instruction)}}{50 \text{ (usable weeks per year)}} = 8 \text{ new classrooms}$$

  - -- Hardware:

    8 x 15 (terminals or word processors per classroom) = 120 hardware items

SUBJECT: Training Requirements for IHS

-- Costs:

Fixed:

8 x $25,000 (conversion cost per classroom)	=	$ 200,000
120 x $7,000 (average cost of terminal/ word processor)	=	840,000
Total		$1,040,000

Yearly Salaries:

36 instructors (yearly average) x $25,000 (average grade GS-11	=	$900,000
16 instructors (yearly average) x $25,000 (average grade GS-11)	=	$400,000

- Information Science and System Development Technology Training

-- Classrooms and hardware of existing or programmed facilities can be used.

-- Costs:

Fixed: None

Yearly Salaries:

6 instructors x $35,000 (average grade GS-13/14)	=	$210,000
or		
4 instructors x $35,000 (average grade GS-13/14)	=	$140,000

SUBJECT: Training Requirements for IHS

Since the "Skills" training requirement has by far the major impact, some additional discussion of it seems warranted. Chart II assumes all the skills training is done using a centralized concept which suggests it probably would be done by ODP or OTE. This is certainly not the case now because skills training for systems such as PERSIGN, ALLSTAR, for example, plus word processing training is done within the respective components by component personnel or contractors. If our own experience with CAMS skills training and the pattern that seems to be developing for skills training for the SAFE system are reasonable models, then we can expect some initial skills training to be conducted by the development contractor, continuing training for new users to be done best on a centralized basis by OTE, and specialized training unique to a given office to be done best within the component. This model suggests, then, that the figures in Chart II for skills training should be allocated across the four categories of contractor, component, ODP, and OTE in some way. At this point, we don't know how to do that. It varies from system to system and, in many cases, is not well defined at this point in time. Some rough estimates were obtained from the users and are shown in Chart III (Attachment C). These data are not in units of man-years, however, and therefore cannot be compared with Chart II. If Chart III has any utility at all, it is to present a rough, first approximation of how the users perceive the training effort distributed across the four categories.

IV. Preliminary Conclusions

Our effort to date suggests the following:

- There is a significant potential requirement for word processing skills training. The data suggests FY-82, but it is probably already with us. The training is being done by individual offices now primarily using contractors and transfusion. The magnitude of the potential requirement suggests that it can probably be done more efficiently on a centralized basis if one or two standardized items of equipment are involved.

- Skills training seems to be, by far, the major requirement, at least in the eyes of the user, in the time period FY-82 to FY-85.

SUBJECT: Training Requirements for IHS

- The increased training requirements implied for the categories we have defined as information science and systems development technology are minor and can be accomplished with programmed facility resources and only small increases in instructor personnel.

- Training requirements are not well defined for many systems. The users feel relatively comfortable when talking about contractor or component-conducted training but, as should be expected, feel uneasy about estimating the amount of training for their system that should be conducted by OTE or ODP.

V. Summary

There is uncertainty about the data collected in this initial effort. We are dealing with training expectations in many systems rather than training requirements. Hence, we view this effort as just the beginning. Most systems which will have major impact on training requirements in the time period of this report will probably have some combination of contractor, component, and centralized OTE or ODP training. The only way these requirements can be defined is by close coordination with the offices concerned. Such coordination is well under way with the SAFE and CAMS systems. With an obvious, immediate requirement such as word processing training, it is not. Hopefully, the process set in motion by this initial effort will stimulate a coordinated effort to address it and other systems where it is appropriate to do so.

STAT

Attachments:
As Stated

cc: IHSA
D/ODP

CHART I

Attachment A

POTENTIAL TRAINING REQUIREMENTS*

Category of Personnel	FY-82	FY-83	FY-84	FY-85	AVERAGE
Project Manager	81	86	88	92	87
Project Builder	163	181	199	197	201
Client Manager	278	334	399	458	367
Client User	4,799#	2,756	3,430	4,212	4,144
Client Transfusions	2,164##	913	1,404	1,339	1,455
Net Client Users Needing Training	3,018###	1,795	2,197	2,948	2,490
Operations/Maintenance Manager	69	78	90	107	86
Operations/Maintenance Worker	116	141	204	321	196

* These numbers do not, in general, represent hard, verified statements of training requirements. In some specific cases such as the SAFE and CAMS systems, the numbers are quite well defined and consistent with the known and expected population of users and the number of computer terminal hardware items programmed to support those users. In other cases, most significantly the word processing area, the numbers are not consistent with the hardware programmed for FY-82 for example. The large number reported as potential training requirements for word processing could probably be described more accurately as training desires or training expectations.

\# Includes 3329 word processor users
Includes 1594 word processor transfusions
Includes 1735 word processor net

CHART II Attachment B

TOTAL INSTRUCTOR REQUIREMENTS (AGENCY-WIDE)*

Category of Training		FY-82	FY-83	FY-84	FY-85	AVERAGE
SKILLS	(35% instructor availability)	44	26	32	43	36
	(75% instructor availability)	20	12	14	20	16
INFORMATION SCIENCE	(35%)	3	3	3	4	3
	(75%)	2	2	2	2	2
SYSTEM DEVELOPMENT TECHNOLOGY	(35%)	2	2	3	3	3
	(75%)	1	1	2	2	2
TOTAL	(35%)	49	31	38	50	42
	(75%)	23	15	18	24	20

* These figures are in units of man-years. The specific numbers were calculated using the assumptions outlined in Section III of the text. An example of the procedure used is as follows: From Chart I, FY-82, 3018 users require skills training:

1. $\frac{3018}{15 \text{ students per class}}$ = 201 course runnings per year

2. 201 X 2 weeks = 402 weeks of instruction

3. $\frac{402}{18}$ (assuming instructors spend 35% of their time in the classroom, 35% X 52 = 18 weeks) = 22 instructors.

   $\frac{402}{39}$ (assuming instructors spend 75% of their time in the classroom, 75% x 52 = 39 weeks) = 10 instructors

4. 2 instructors per skills class = 2 X 22 = 44
   = 2 X 10 = 20

CHART III

Attachment C

USER ESTIMATES OF INSTRUCTOR REQUIREMENTS FOR SKILLS TRAINING*

SOURCE	FY-82	FY-83	FY-84	FY-85
Contractor	64	71	63	59
Component	129	124	133	137
ODP	55	44	37	38
OTE	38	40	37	38

* Not in man-years. For example, the data includes for FY-83, 15 NFAC personnel identified as SAFE instructors. It is estimated that they will spend approximately one-fourth of their time on instructional duties.

SUBJECT: Training Requirements for IHS

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STAT OTE/ISC/[redacted]:ams (24 Jun 81)

DD/A 81-0689

10 APR 1981

MEMORANDUM FOR: Director of Training & Education

FROM: Max Hugel
Deputy Director for Administration

SUBJECT: Training Requirements for IHS

1. We need to develop a specific projection of our general training requirements for IHSs (Information Handling System). Of particular concern are the training requirements that relate to the development and operation of new systems.

The overall concern is the adequacy of our projected resources to deal with the workload. The potential student population is Agencywide, with applicability determined by current and projected assignments by cognizant career authority.

2. As part of the mission planning for your Information Science Center, could you please develop the total Agency requirements and project how the Center best sees those requirements being met for training for IHSs. I would like you to take guidance from the Information Handling Systems Architect on this effort and submit your report via his office.

This does not imply that the Information Science Center will be performing all of this training, even though it will clearly be playing a key role. Clearly, there will have to be many intercomponent discussions based on this evaluation, concerning how these requirements are best met. The principal purpose of the planning effort is a definition of the total requirement on the basis of which such discussions can be held to develop the strategic plan.

In your developments, please identify the composition of the requirements in terms of the three IHS training categories we have discussed:

- Skills Training
- Information Sciences
- Systems Development Technology

The Skills Training is basically comprised of two categories: component-unique and multicomponent. The Systems Development Technology category is essentially a new internal training subject area for the Agency, and requirements will essentially have to be developed from basic considerations without the assistance of a previous experience base. Included in Systems Development Technology are such course types as:

- The Systems and Software Package Development Process
- Structured Design of Software Systems and Packages
- Estimating IHSs and Software Packages
- Management Processes and Procedures
- Independent Test and Validation of Software Systems

It should be recognized that in several instances, courses that apply to systems development, the work of IHS careerists, do not apply to the development of software packages. The latter is chiefly an adjunct function of a careerist in some other professional discipline.

Because we have not had this category of training available on a centralized basis, there has been some component training of this type. You should develop your estimates of the requirements on the basis that all of the Systems Development Technology training that is of an Agency-wide character will be done on a centralized basis.

3. The requirements should also be categorized by the source of the need for the skill. In this instance of large system requirements, the requirements produced by each should be specifically enumerated, e.g., SAFE, CRAFT, MERCURY, LIMS, or OF's New Payroll/Finance systems. Smaller systems or general requirements should be aggregated into one or a few broad categories.

4. The training requirements planning as it affects OTE should be specific with respect to the source of the training personnel, i.e., permanent OTE staff, rotational staff, and contractor. Because the Systems Development Technology area is new, I would expect that to be almost totally contractual in FY-82, with the contractor portion of the workload diminishing rapidly in the outyears.

5. In developing the training requirements, please specifically identify the training "transfusion" factors. This transfusion, reflecting the learning of one employee from another, vice by formal course of instruction, should be based on the assumption of OTE allocation of course attendance to take full advantage of this factor. The transfusion factor estimates identified should be specific by type of training.

6. Applying these planning considerations to four years, 1982 through 1985, the best way to summarize these factors appears to be in two tables. The first identifies the student training requirements by:

- o Year (1982, 1983, 1984 1985)
- o Category and subcategory of training (skills, etc.)
- o Source (SAFE, etc.)

The second identifies the instructional staff requirements by:

- o Year (1982, 1983, 1984, 1985)
- o Category and subcategory of training
- o Type of instructor (OTE, rotation, contractor)

The second table should be supplemented by the enumeration of the transfusion factors applied.

7. If the summary of these IHS training requirements produces different OTE budgetary requirements, for the four outyears that we planned, they should be identified. This table composition should be by:

- o Year (1982, 1983, 1984 1985)
- o Type of training (skills, etc.)

8. In order to be able to process this planning information and be able to start our training efforts promptly in FY-82, as early an availability of this report as possible is desired. A big consideration in this regard is contracted training in the Systems Development Technology area, and the associated time lags in initiating such efforts. A report delivery of 15 June 1981 is requested.

/s/ Max Hugel

Max Hugel

cc: DD/NFAC
DO/IMS
D/CO
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D/L
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STAT IHSA: [redacted] (2 Apr 81)
RETYPE: il (8 Apr 81)